

Proton Plan

Cost, Schedule and Management

Director's Review
August 2005

Jeff Sims

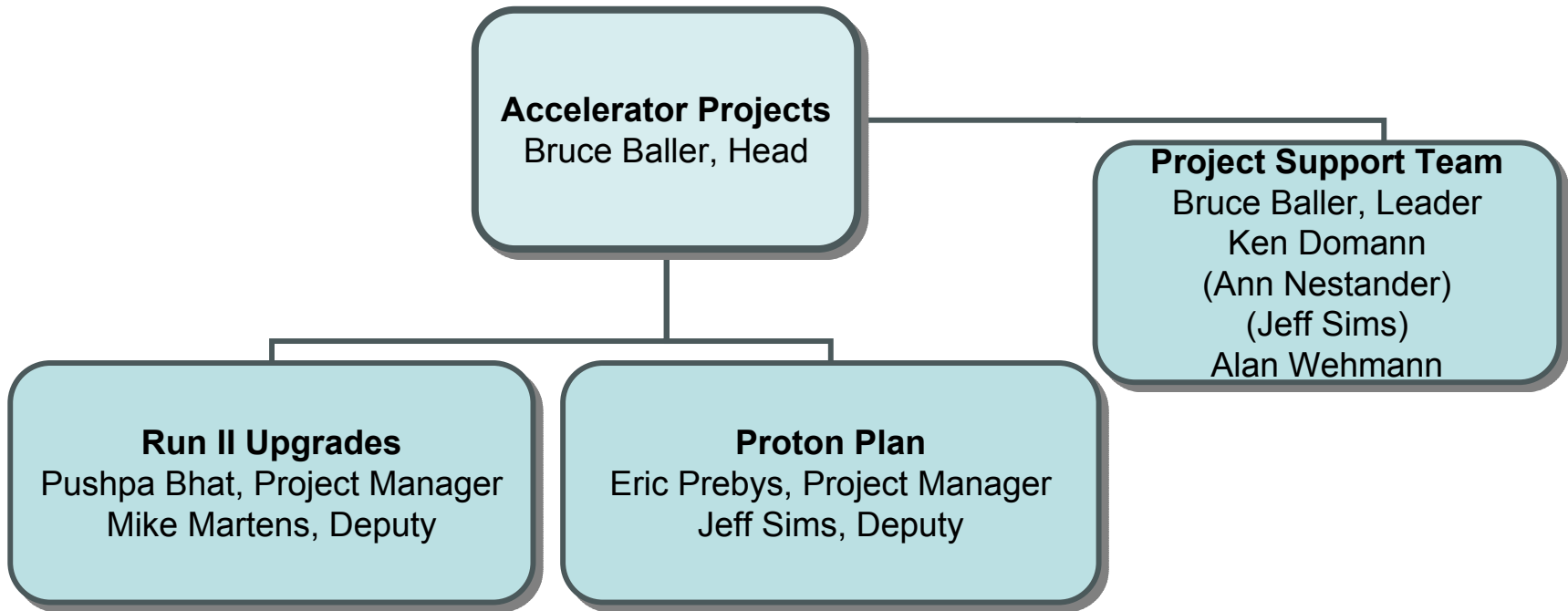
- The Campaign
- Project Management Plan
- Project Organization
- Safety
- Resource Loaded Schedule
 - Approach and Cost Accounting
 - Schedule at level 3
 - Critical Path Analysis
 - Labor Resources
 - M&S Resources
 - Milestones
 - Reviews
- Estimating Methodology
- Contingency
- Budget Guidance
- Monthly Cost Reporting
- Change Control
- Risk Management
- Summary

- The Proton Plan will utilize project management tools to identify, develop and track a series of machine upgrades intended to maximize the protons on target to our neutrino experiments.
 - This is not a conventional "Project"
 - Provides the Directorate and AD management with the ability to gauge progress of the work through monthly PMG updates - POT Projections and Earned Value Reports.
 - Elements of the of the plan are one of the following:
 - Fully Scoped
 - Developing - Established as potential improvements through analysis/studies - scope of work is being developed.
 - Placeholders - Awaiting analysis/studies to further develop the scope of the work.



- PMP
 - WBS Structure and Funding,
 - Organization,
 - Management Philosophy and Responsibilities,
 - Systems and procedures - Reporting & Meetings,
 - Baseline, Control Levels, and Performance Monitoring,
 - Change Control Management,
 - Environment Safety and Health.

- The following slides are prepared based on the philosophy of the Proton Plan PMP.

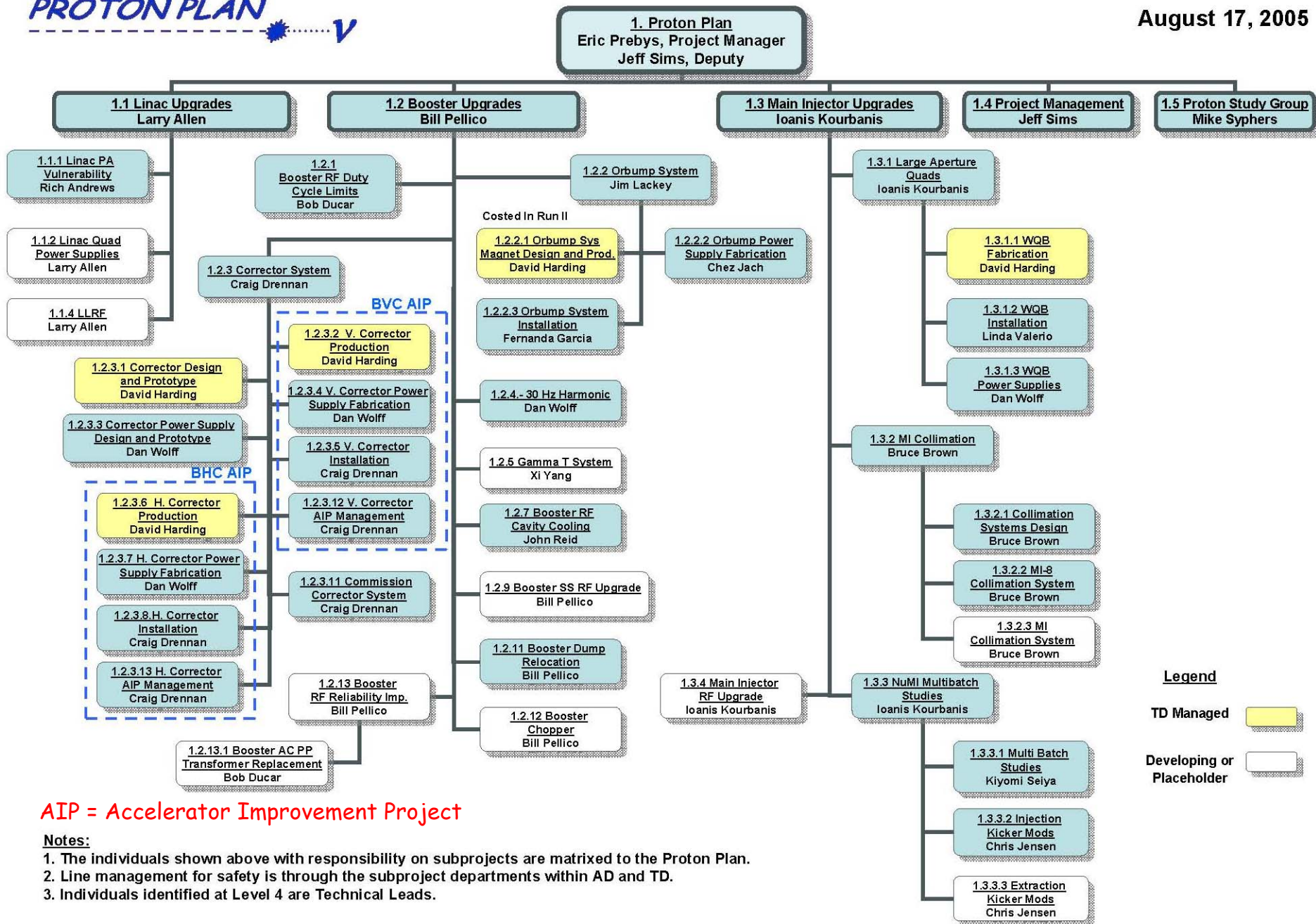


Project Support Team provides help on:

- Maintaining Resource Loaded Schedule (MS Project)- Domann
- Accounting Support with Cobra Interface - Nestander
- General Project Management Support– Sims
- Web Support - Wehmann

Organizational Chart by WBS

August 17, 2005



- Safety is our First Priority
- Line management for safety will follow the existing AD and TD departments.
 - AD
 - For 1.1 and 1.2 line management for safety is through the Proton Source Department to AD headquarters
 - For 1.3 line management for safety is through the Main Injector Department to AD headquarters
 - TD
 - For all TD work line management for safety is through the existing TD management organization to TD headquarters.
 - AIP
 - AIP's will follow DOE Order 413.3 and be treated as a stand alone project.
 - For all AIP Projects line management for safety is through the AIP Project Management to AD Headquarters. Mike Andrews will provide safety support for AIP Projects.
- Safety topics will be discussed at the biweekly Proton Plan team meetings

- Utilizing MS Project 2002 - ~ 560 lines now.
- Structure, Dates, Logic and Resources were provided by level two, and three managers.
- WBS mapped to cost accounts:
 - IE. WBS 1.2.1 Corresponds to cost account 1.02.01
 - Four Accounting "Projects" within the Proton Plan + AIP's:
 - 22 - AD
 - 32 - TD
 - 42 - PPD
 - 52 - CD
 - AIP's (BVC, BHC, Future)
 - Current available cost accounts:
 - Accounting Project 22- 22
 - Accounting Project 32- 2
 - It is important to note that we have identified spare equipment costs within the schedule to facilitate collecting these costs in "spares" accounts.

We will discuss Cost Accounts more in Breakout sessions

WBS	Name	St	Fin 2004	2005				2006				2007				2008			
				4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3
1	Proton Plan	Thu 9/30/04	Wed 7/16/08																
1.1	Linac Upgrades	Wed 12/15/04	Fri 1/18/08																
1.1.1	(Contains Place Holder for Thales Facility)	Wed 12/15/04	Fri 8/10/07																
1.1.2	Linac Quad Power Supplies (Developing)	Mon 1/3/05	Fri 1/18/08																
1.1.4	200 Mhz LLRF Upgrade (Place Holder)	Thu 9/1/05	Mon 10/1/07																
1.2	Booster Upgrades	Thu 9/30/04	Wed 7/16/08																
1.2.1		Mon 8/8/05	Thu 10/6/05																
1.2.2		Thu 9/30/04	Wed 1/25/06																
1.2.3		Tue 1/4/05	Wed 7/16/08																
1.2.4		Mon 1/3/05	Mon 9/18/06																
1.2.5	Gamma-t System (Placeholder)	Mon 5/2/05	Fri 1/18/08																
1.2.7		Tue 1/4/05	Fri 11/11/05																
1.2.9	Booster Solid State RF Upgrade (Placeholder)	Mon 10/3/05	Mon 10/3/05																
1.2.11		Mon 5/2/05	Tue 1/10/06																
1.2.12	Booster Chopper (Developing)	Mon 10/3/05	Mon 10/2/06																
1.2.13	Booster RF Reliability Improvements(Developing)	Mon 8/22/05	Mon 10/2/06																
1.3	Main Injector Upgrades	Thu 9/30/04	Tue 1/9/07																
1.3.1		Thu 9/30/04	Fri 8/25/06																
1.3.2	(Except for MI Collimation)	Tue 2/1/05	Fri 12/1/06																
1.3.3	(Except Extr. Kicker)	Mon 2/7/05	Tue 1/9/07																
1.3.4	(Studies)	Tue 3/1/05	Mon 3/6/06																
1.4	Management	Tue 2/1/05	Wed 7/16/08																
1.5	Proton Study Group	Fri 4/1/05	Fri 3/31/06																

Inception 10/1/04

(Two AIP's)

 Denotes Fully Scoped Level 3 Subprojects for Baseline Review

Near the Critical Path?

In the next 6 months

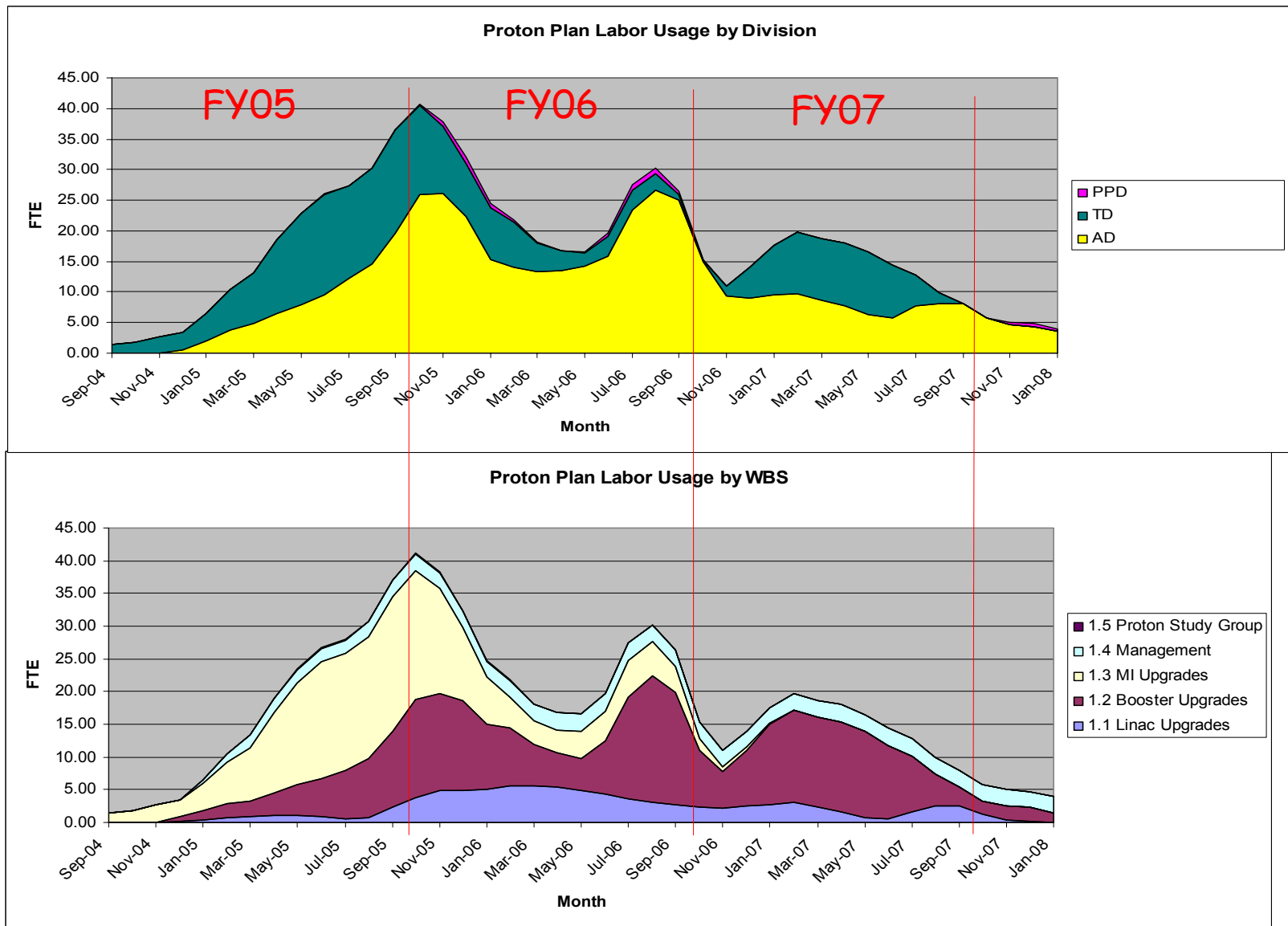
(Float <10 Days for Installation Activities)
(Float <30 days for Fabrication Activities)

WBS	Name	St	Fin	Float	
1.2.2.1.2.3	Assemble, Test & Rework 1st Article OrBump Magnet	10/1/04	9/15/05	12 d	Orbump
1.2.2.1.2.4	Assemble Final 5 OrBump Magnets (2+3 spares)	2/23/05	9/15/05	12 d	
1.2.2.1.3.3	Assemble OrBump Stripline	9/22/05	10/12/05	20 d	
1.2.2.1.3.4	OrBump Stripline Assy Complete	10/12/05	10/12/05	20 d	
1.2.2.1.4.3	Mount OrBump Components on Girder	10/7/05	11/7/05	12 d	
1.2.2.1.4.4	Survey OrBump Magnets & Girder	11/8/05	11/14/05	12 d	
1.2.2.1.4.5	OrBump Girder Assy Complete	11/14/05	11/14/05	12 d	Corrector
1.2.3.1.4	Corrector Prototype Production	4/12/05	6/12/06	0 d	
1.2.11.5.4	Booster Dump Relocation Run Power to MP01 Septum	6/1/05	1/6/06	1 d	BDR
1.2.11.5.14	Booster Dump Relocation Alignment	1/9/06	1/10/06	1 d	
1.2.11.5.15	Booster Dump Relocation Installation Complete	1/10/06	1/10/06	1 d	
1.3.1.1.5.2	WQB Produce Units 2 - 7	4/28/05	10/24/05	15 d	WQB
1.3.1.2.3	WQB Misc Fabrication	8/31/05	10/28/05	17 d	
1.3.2.2.2	Fabricate MI-8 Collimation System	9/13/05	12/12/05	3 d	MI- 8 Coll.
1.3.2.2.3	Install MI-8 Collimators	12/13/05	1/6/06	3 d	
1.3.2.2.4	MI-8 Collimators Installation Complete	1/6/06	1/6/06	3 d	
1.3.3.2.2.1	Assemble/Test Control Skid	9/6/05	10/27/05	26 d	Inj. Kicker
1.3.3.2.2.2	Assemble/Test Resistors	10/11/05	11/21/05	16 d	

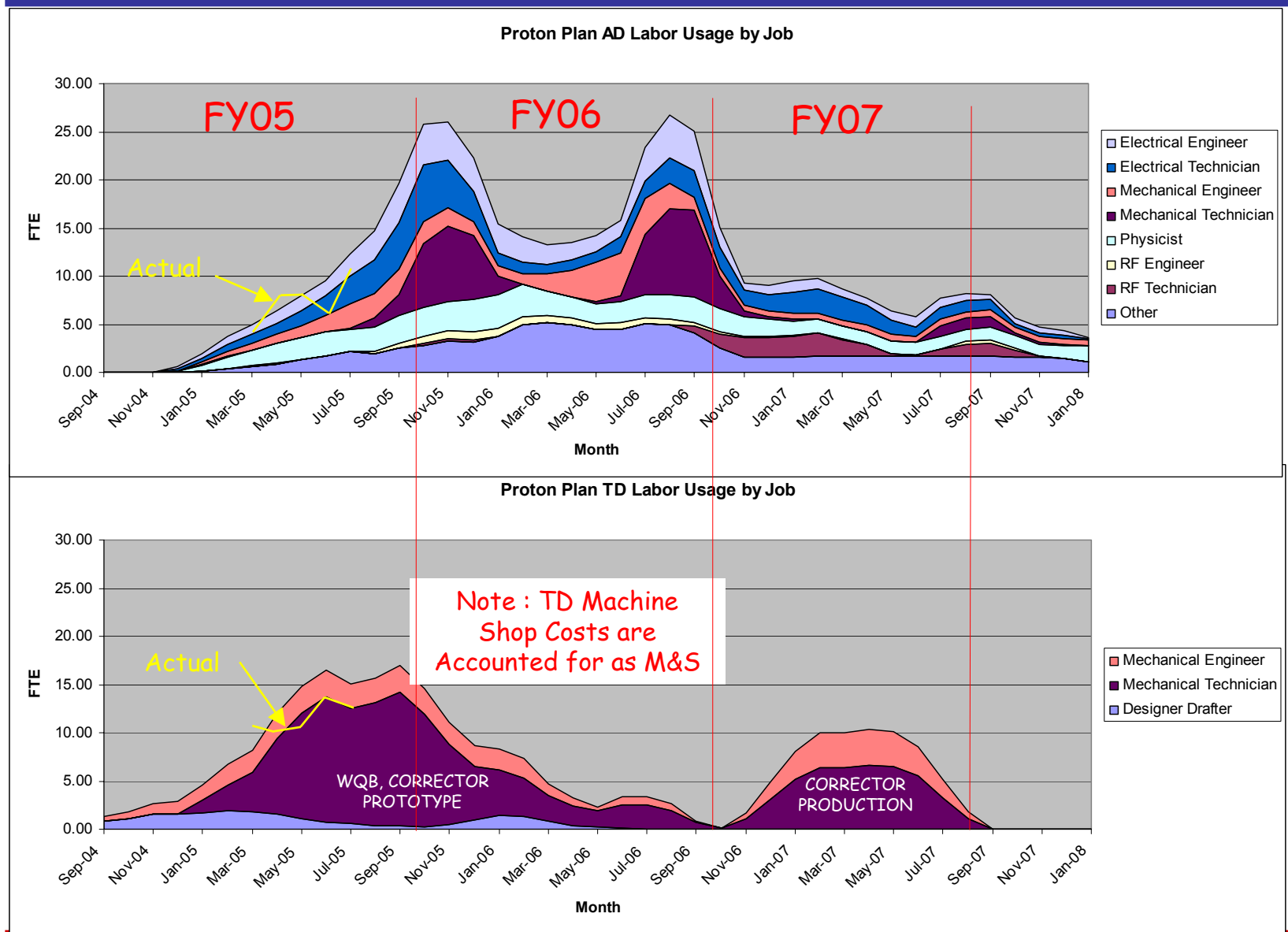
Note:

We are not showing Developing or Placeholder tasks as they are not sufficiently developed to analyze float.

Labor Profiles



Labor Profiles



WBS	Name	M&S	SWF	M&S & SWF Escalated, K	M&S Cont. %	SWF Cont. %	M&S W/ Cont., K	SWF W/ Cont. K	M&S & SWF Esc.+ Cont, K
		Escalated , K	Escalated, K						
1	Proton Plan	\$9,802	\$7,230	\$17,031	50%	52%	\$14,689	\$10,975	\$25,664
1.1	Linac Upgrades	\$3,377	\$1,348	\$4,726	56%	92%	\$5,281	\$2,594	\$7,874
1.1.1	(Place Holder for Thales Facility)	\$3,052	\$579	\$3,632	52%	93%	\$4,632	\$1,116	\$5,748
1.1.2	Linac Quad Power Supplies (Developing)	\$193	\$221	\$414	99%	73%	\$384	\$383	\$767
1.1.4	200 Mhz LLRF (Place Holder)	\$132	\$548	\$680	100%	100%	\$264	\$1,096	\$1,360
1.2	Booster Upgrades	\$5,113	\$2,911	\$8,024	43%	45%	\$7,318	\$4,233	\$11,551
1.2.1		\$1	\$34	\$35	30%	30%	\$1	\$44	\$45
1.2.2		\$131	\$192	\$322	26%	31%	\$164	\$251	\$415
1.2.3		\$2,764	\$1,814	\$4,578	32%	43%	\$3,660	\$2,602	\$6,262
1.2.4	(Project Decision 1/06)	\$1,084	\$602	\$1,686	40%	40%	\$1,518	\$842	\$2,361
1.2.5	Gamma-t System (Placeholder)	\$206	\$115	\$321	100%	100%	\$411	\$231	\$642
1.2.7		\$3	\$6	\$9	40%	29%	\$4	\$8	\$12
1.2.9	Booster SS RF Upgrade (Placeholder)	\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
1.2.11		\$251	\$69	\$320	40%	40%	\$352	\$97	\$449
1.2.12	Booster Chopper (Developing)	\$170	\$68	\$237	100%	100%	\$339	\$135	\$474
1.2.13	Booster RF Reliability Improvements (Developing)	\$504	\$12	\$516	72%	96%	\$869	\$23	\$892
1.3	Main Injector Upgrades	\$1,295	\$1,674	\$2,969	60%	47%	\$2,070	\$2,462	\$4,532
1.3.1		\$356	\$1,086	\$1,442	19%	35%	\$425	\$1,462	\$1,886
1.3.2	(Except for MI Coll.)	\$635	\$376	\$1,011	87%	84%	\$1,184	\$693	\$1,877
1.3.3	(Except Extr. Kicker)	\$302	\$190	\$493	52%	47%	\$459	\$279	\$738
1.3.4	(Studies)	\$2	\$21	\$23	0%	34%	\$2	\$28	\$30
1.4	Management	\$16	\$1,286	\$1,301	30%	30%	\$21	\$1,671	\$1,692
1.5	Proton Plan Phase I Study	\$0	\$11	\$11	0%	30%	\$0	\$15	\$15

Denotes Fully Scoped Level 3 Subprojects for Baseline Review

Milestones

WBS	Name	MS Class	Date	2005				2006				2007				2008				2009	
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2
1.1.1.1.2	Linac Task Force Phase 1 Report Issued	C	2/14/05	■	2/14			✓													
1.1.1.1.4	Linac Task Force Phase 2 Report Issued	C	6/30/05			■	6/30	✓													
1.1.2.1.6	Linac Quad PS Project Decision	C	8/1/05			■	8/1	✓													
1.5.2	Submit Preliminary Proton Study Group Report	C	8/1/05			■	8/1	✓													
1.3.1.1.3	WQB Design Complete	C	8/15/05			■	8/15	✓													
1.3.4.1.1.3	MI RF Cavity Prototype Decision	C	8/16/05			■	8/16	✓													
1.2.1.1.6	Booster RF Report Issued	C	10/6/05			■	10/6														
1.2.2.1.2.6	OrBump Magnets Ready for Install on Girder	B	10/6/05			■	10/6														
1.2.2.1.3.4	OrBump Stripline Assy Complete	B	10/12/05			■	10/12														
1.3.1.3.4	WQB P.S. Ready for Installation	B	10/14/05			■	10/14														
1.4.4	Start 2005 Shutdown	C	10/31/05			■	10/31														
1.5.3	Submit Final Proton Study Group Report	C	11/1/05			■	11/1														
1.3.1.1.6.4	WQB Ready for Installation	B	11/2/05			■	11/2														
1.2.2.2.12	OrBump Power Supply Ready for Installation	B	11/9/05			■	11/9														
1.2.7.1.3	Flex Tube Installation Complete	A	11/11/05			■	11/11														
1.3.3.1.4.1.4	Barrier Bucket Cavity Installation Complete	A	11/11/05			■	11/11														
1.2.2.1.4.5	OrBump Girder Assy Complete	B	11/14/05			■	11/14														
1.3.1.3.6	WQB P.S. Installation Complete	B	11/18/05			■	11/18														
1.3.3.2.2.3	Injection Kicker Mod Ready for Installation	C	11/21/05			■	11/21														
1.3.3.2.3.4	Injection Kicker Mods Complete	B	11/30/05			■	11/30														
1.2.4.1.4	30 Hz Harmonic Project Decision	C	12/1/05			■	12/1														
1.2.2.3.1.5	OrBump System Installation Complete	A	12/12/05			■	12/12														
1.3.1.2.4	WQB Align/Install Complete	B	12/16/05			■	12/16														
1.3.1.3.7	WQBs System Installed	A	12/16/05			■	12/16														
1.2.5.1.2	Gamma-t Studies Complete	A	12/29/05			■	12/29														

MS Class:

A = MS that will directly impact the Planned POT Projections

B = MS that will not directly impact the Planned POT Projections

C = Internal MS.

Milestones

WBS	Name	MS Class	Date	2005				2006				2007				2008				2009	
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2
1.3.2.2.4	MI-8 Collimators Installation Complete	A	1/6/06					1/6													
1.2.11.5.15	Booster Dump Relocation Installation Complete	A	1/10/06					1/10													
1.4.5	Finish 2005 Shutdown	C	1/10/06					1/10													
1.2.2.5	OrBump System Commissioned	A	1/25/06					1/25													
1.3.4.2.2	MI RF Scope Decision	C	3/6/06					3/6													
1.2.3.1.7	Corr Prototype Design Complete	C	6/20/06					6/20													
1.2.3.1.6	Corrector Prototype Magnet Complete	C	7/17/06					7/17													
1.2.3.15	Corrector AIPs Approved	C	7/18/06					7/18													
1.4.6	Start 2006 Shutdown	C	8/7/06					8/7													
1.1.1.1.6	Linac Task Force 2 Complete	C	8/11/06					8/11													
1.2.4.2.4	30Hz Installation Complete	A	9/18/06					9/18													
1.3.2.3.4	MI Collimation System Install/Align Complete	A	9/21/06					9/21													
1.2.12.5.7	Booster Chopper Installed	A	10/2/06					10/2													
1.2.13.1.4	Booster AC Pulsed Transformer Installation Complete	B	10/2/06					10/2													
1.4.7	Finish 2006 Shutdown	C	10/2/06					10/2													
1.3.2.4	Main Injector Loss Mitigation Complete	A	12/1/06					12/1													
1.3.3.1.3	Slip Stacking for NuMI Complete	A	1/9/07					1/9													
1.2.3.2.4	Vert Corr Magnets Ready for Installation	B	8/1/07					8/1													
1.2.3.6.4	Horiz Corr Magnets Ready for Installation	B	8/1/07					8/1													
1.4.8	Start 2007 Shutdown	C	8/6/07					8/6													
1.1.4.4	200 Mhz LLRF Installation Complete	B	10/1/07					10/1													
1.4.9	Finish 2007 Shutdown	C	10/1/07					10/1													
1.1.2.2.6	Linac Quad PS Upgrade Installation Complete	B	1/18/08					1/18													
1.2.3.5.3.2.9	Vertical Corrector Installation Complete	B	1/18/08					1/18													
1.2.3.8.3.2.10	Horizontal Correctors Installation Complete	B	1/18/08					1/18													
1.2.3.10	Corrector System Complete	A	7/16/08																		

MS Class:

A = MS that will directly impact the Planned POT Projections

B = MS that will not directly impact the Planned POT Projections


C = Internal MS.


WBS	Name	Date	
1.3.2.1.2.2	Review Concept for MI-8 Collimation System	6/7/05	COMPLETE
1.2.2.2.4	OrBump P.S. Design Review	6/15/05	COMPLETE
1.2.11.2	Review Booster Dump Relocation Design	7/5/05	COMPLETE
1.1.2.1.3	Linac Quad PS Conceptual Review Prototype	8/2/05	COMPLETE
1.2.4.1.3	Review 30 Hz Harmonic Prototype	12/1/05	
1.2.12.2.2	Review Booster Chopper	12/2/05	
1.2.5.1.3	Gamma-t Review/Project Decision	1/3/06	
1.3.2.1.3.2	Review Concept for MI Collimation System	2/2/06	
1.1.4.1.3	200 Mhz LLRF Design Review	2/7/06	
1.2.3.14	Corrector System Technical Review	7/18/06	
1.2.3.16	Review Booster Modifications Design	7/20/06	
1.2.3.17	Corrector System Installation Review	3/1/07	

- This list will grow as more subprojects are fully scoped.
- We maintain all of the review information on our website.

- M&S Estimating of Fully Scoped Subprojects:
 - We have either engineers estimates or vender quotations as back up to the M&S resources shown in the resource loaded schedule.
- Labor Estimating on Fully Scoped Subprojects:
 - TD effort - We have engineers estimates of labor.
 - AD effort - We have labor estimates based on the L3 and L4 managers input. This is our best attempt to set a scale of the required labor needs.
 - AD efforts within the shutdown are closely coordinated with AD Department heads to develop and establish labor needs and priorities.
 - The baseline labor estimates are our latest estimated need however, coordination of labor needs with the appropriate department heads is an ongoing process and will be updated as required throughout the duration of the Proton Plan.
- Estimating on Developing or Placeholder Subprojects:
 - For Developing and Placeholder subprojects we have estimates of varying levels of completeness based primarily on past project experience.

- Estimation of Salary With Fringe (SWF) Cost:
 - MSP utilizes average labor rates of various job categories (eg -AD Mechanical Tech, AD Electrical Engineer) multiplied by labor burden rates (Vacation OPTO, Fringe) and estimated required hours to establish SWF. For example say an AD ET is needed for 40 hours
 - $40\text{hours} \times \$22/\text{hr} \times 1.5876 = \1397.09 SWF


 Ave. Hourly Rate


 Weekly LBR
- Contingencies vary based on our confidence in the estimates.
- The Basis Of Estimate (BOE) Book contains this back up information. Also in MSP notes and links.
- Escalation is currently applied within MSP using the following escalation factors:
 - Labor = 4.3% per year
 - M&S = 2.8% per year

Note:

The escalation rates will be revised based on the latest DOE guidance and budget office recommendations.

- We have reviewed contingency with all level 3 Managers.
 - The guidelines for contingency allocation are:
 - 1) If the task is complete0% cont.
 - 2) If the task is > than 70% complete20% cont.
 - 3) If we have firm vendor quotes.....20% to 30% cont.
 - 4) If we have an engineers estimate....30% to 40% cont.
 - 5) If the estimate is top down ...40% to 60% cont.
 - 6) Placeholder - WAG....60% to 100% cont.

Fully Scoped
Subprojects

Developing and
Placeholder
Subprojects
- Current Level 1 Contingency:
 - Total = 51 %
 - On Labor = 52 %
 - On M&S = 50 %

- The Proton Plan Budget Guidance is:

	M&S w/ Cont.	SWF w/ Cont.	Total
➤ FY05	\$3,854,000	\$3,473,000	\$7,327,000
➤ FY06	\$5,769,000	\$1,929,000	\$7,698,000
➤ FY07	\$5,164,000	\$1,899,000	\$7,063,000
➤ FY08	\$5,717,000	\$875,000	\$6,592,000
➤ Total	\$20,504,000	\$8,176,000	\$28,680,000

- The Latest Proton Plan Resource Extraction:

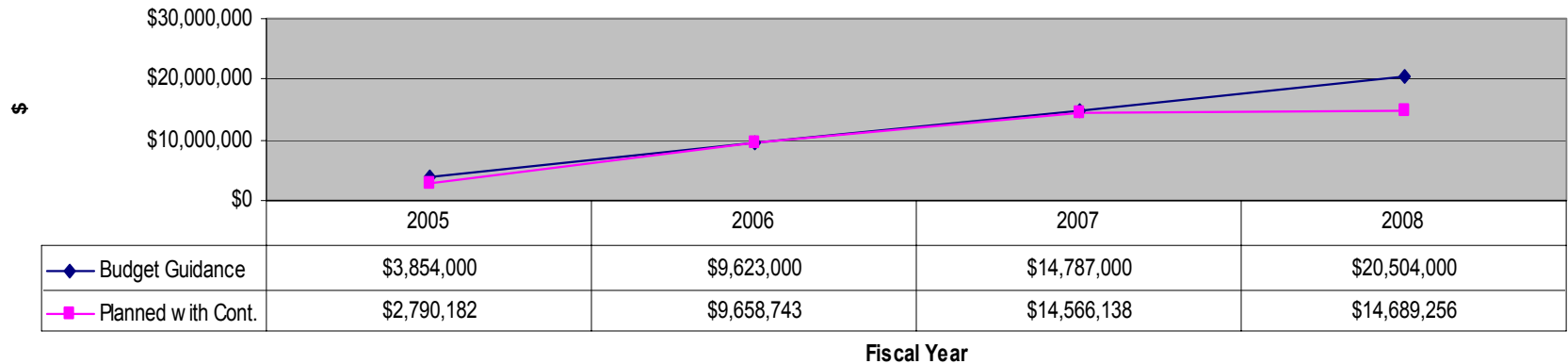
	M&S w/ Cont.	SWF w/ Cont.	Total
➤ FY05	\$2,790,182	\$2,234,984	\$5,025,166
➤ FY06	\$6,868,561	\$4,897,768	\$11,766,329
➤ FY07	\$4,907,395	\$3,270,147	\$8,177,542
➤ FY08	\$ 123,118	\$ 571,801	\$ 694,919
➤ Total	\$14,689,256	\$10,974,700	\$25,663,956

- Conclusions

- We are within the total budget guidance.
- We are over by \$2.8 million in SWF - We currently have \$2 Million in Placeholder subprojects (Thales Facility, LLRF, MI Collimation)
- We may still need some budget for Booster SS RF Upgrade.

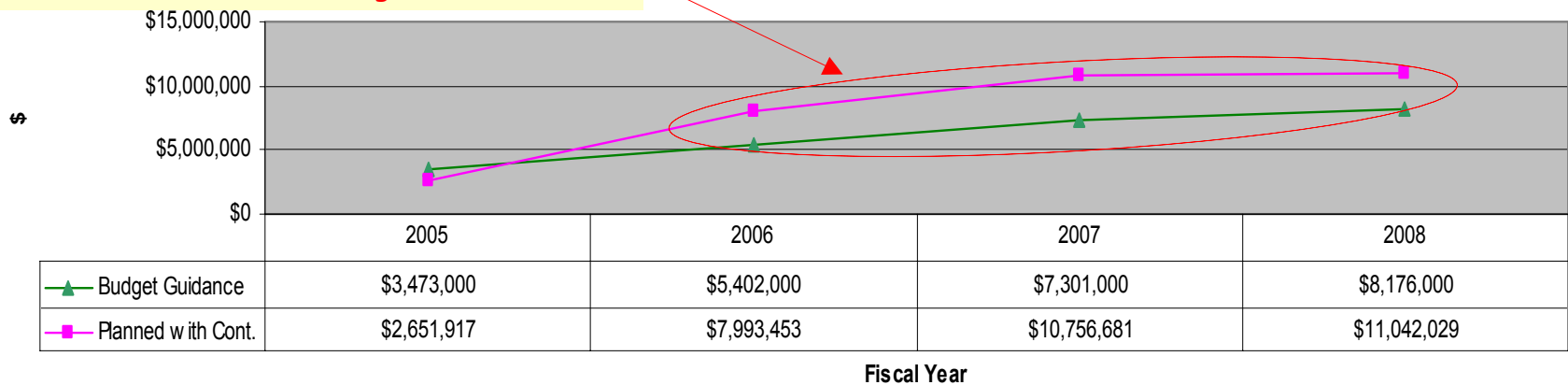
Spending Profile

M&S Cumulative



With contingency we fall short by \$2.8mill. Much of this resides in Developing or Placeholder subprojects. PM will work with AD HQ to revise SWF budget as needed.

SWF Cumulative



- Obligations - Monthly and cumulative M&S obligations will be reported by cost account from Oracle to Cobra. Cobra will prepare a report to compare planned obligations to actual obligations. This report will be presented at monthly PMG's.
- Earned Value - Monthly and cumulative actual M&S and SWF costs will be reported by cost account from Oracle to Cobra. Cobra will prepare an earned value report. Cobra will generate cost and schedule variance at all WBS levels. This report will be presented at monthly PMG's.
- The above reports along with the division effort reports will be utilized monthly by Project Management to evaluate progress, anticipate change requests, and identify problem areas.
- Note: AIP's will have separate monthly cost reports.

M&S Spending by Obligation		Planned			ITD Costs		% Used		
		Estimate					ITD	ITD	ITD Obl+RIP
		Thru 7/05	FY05	Total	Obl.	Obl+RIP	/June Est	/FY05 Est	/Total Est
1	Proton Plan	2,145	2,486	9,802	2,105	2,232	104%	90%	23%
1.1	Linac Upgrades	1,471	1,472	3,377	1,465	1,465	100%	100%	43%
1.1.1	Linac PA Vulnerability	1,469	1,470	3,052	1,464	1,464	100%	100%	48%
1.1.2	Linac Quad Power Supply	2	2	193	2	2	78%	78%	1%
1.1.4	LLRF	0	0	132	0	0	0%	0%	0%
1.2	Booster Upgrades	288	388	5,113	195	293	102%	75%	6%
1.2.1	Determine Rep Rate Limit	0	1	1	0	0	0%	0%	0%
1.2.2	Orbump System	111	122	131	122	122	111%	100%	94%
1.2.3	Corrector System	29	49	2,764	15	15	50%	30%	1%
1.2.4	30 Hz Harmonic	32	41	1,084	25	25	78%	61%	2%
1.2.5	Gamma T System	0	0	206	0	0	0%	0%	0%
1.2.7	Drift Tube Cooling	0	0	3	0	0	0%	0%	0%
1.2.9	Booster SS RF Upgrade	0	0	0	0	0	0%	0%	0%
1.2.11	Booster Dump Relocation	116	136	251	33	131	113%	96%	52%
1.2.12	Booster Chopper	0	0	170	0	0	0%	0%	0%
1.2.13	Booster RF Modifications	0	40	504	0	0	0%	0%	0%
1.3	Main Injector Upgrades	385	623	1,295	445	473	123%	76%	37%
1.3.1	Large Aperture Quads	293	340	356	319	319	109%	94%	90%
1.3.2	MI Collimation System	2	144	635	54	82	4648%	57%	13%
1.3.3	NuMI Multibatch Operation	88	137	302	71	71	80%	52%	23%
1.3.4	MI RF Upgrade	2	2	2	1	1	54%	50%	50%
1.4	Management	2	3	16	1	1	39%	23%	4%
1.5	Proton Study Group	2	3	16	0	0	0%	0%	0%

		% Complete				Labor, k				M&S, k				Total, k	
		Planned	Actual	Estimate		ACWP	Variance	Variance	Variance	ACWP	Variance	Variance	Variance	Variance	Variance
				BCWS	BCWP										
1	Proton Plan	9.4%	9.4%	1,099	1,081	1,061	20	-18	507	522	495	26	15	47	-3
1.1	Linac Upgrades	1.5%	1.5%	63	63	60	4	0	7	7	2	5	0	9	0
1.1.1	Linac PA Vulnerability	0.2%	0.2%	4	4	1	2	0	5	5	0	5	0	7	0
1.1.2	Linac Quad Power Supply	14.8%	14.9%	59	60	58	1	0	2	2	2	0	0	2	0
1.1.3	LLRF	0.0%	0.0%	0	0	0	0	0	0	0	0	0	0	0	0
1.2	Booster Upgrades	5.7%	4.9%	272	242	216	26	-29	188	154	129	25	-33	51	-63
1.2.1	Determine Rep Rate Limit	0.0%	0.0%	0	0	4	-4	0	0	0	0	0	0	-4	0
1.2.2	Orbump System	57.4%	50.3%	74	69	88	-19	-5	111	93	108	-15	-17	-34	-23
1.2.3	Corrector System	2.3%	1.7%	76	64	71	-7	-12	29	16	15	1	-14	-6	-26
1.2.4	30 Hz Harmonic	7.1%	6.6%	88	80	49	31	-8	32	30	1	30	-2	61	-9
1.2.5	Gamma T System	5.2%	3.5%	17	11	0	11	-6	0	0	0	0	0	11	-6
1.2.7	Drift Tube Cooling	18.8%	18.8%	2	2	0	2	0	0	0	0	0	0	2	0
1.2.9	Booster SS RF Upgrade	0.0%	0.0%	0	0	0	0	0	0	0	0	0	0	0	0
1.2.11	Booster Dump Relocation	9.7%	9.8%	15	16	4	12	1	16	15	6	9	-1	21	0
1.2.12	Booster Chopper	0.0%	0.0%	0	0	0	0	0	0	0	0	0	0	0	0
1.2.13	Booster RF Modifications	0.0%	0.0%	0	0	0	0	0	0	0	0	0	0	0	0
1.3	Main Injector Upgrades	31.1%	31.1%	613	566	589	-23	-47	310	358	364	-6	48	-29	1
1.3.1	Large Aperature Quads	51.9%	55.2%	530	511	538	-27	-19	219	286	287	-2	67	-29	48
1.3.2	MI Collimation System	5.4%	4.5%	53	43	44	-1	-9	2	2	11	-9	0	-10	-9
1.3.3	NuMI Multibatch Operation	23.4%	15.7%	27	9	1	8	-19	88	69	64	4	-19	12	-38
1.3.4	MI RF Upgrade	19.5%	21.6%	3	3	7	-4	0	2	2	1	1	0	-3	0
1.4	Management	11.5%	11.5%	148	143	195	-52	-4	2	2	1	1	0	-51	-4
1.5	Proton Study Group	33.4%	33.4%	4	4	0	4	0	0	0	0	0	0	4	0

- Once the Proton Plan has been baselined we will utilize the change control as outlined in the PMP:

➤ **Baseline Change Control Levels**

<i>CHANGE CONTROL THRESHOLDS</i>	DIRECTORATE	PROJECT MANAGER
TECHNICAL	Any change that affects ES&H requirements. Any change that affects the PoT projections by more than 10%.	Changes that do not affect ES&H requirements or affect technical scope
COST	Any change to total cost exceeding \$100k.	Any cost change at level 2 or contingency use less than \$100k with concurrence of AD HQ.
SCHEDULE	Any change to a Level A milestone by more than 1 month.	Any change to a lower level milestone by more than 1 month.

- Note: Change Control for AIP's will also conform to the procedures identified in the Project Execution Plan (PEP)

- Technical and Operational Subproject risks and associated mitigations are identified by level three managers.
- The Greatest Proton Plan Risks appear to be:
 - Availability of 7835 tubes, mitigated by purchasing what we hope to be a two year supply of tubes and understanding the alternate path.
 - Will the Booster RF be reliable at higher rep rates, mitigated by including the Booster RF Improvement (1.2.13) an Booster SS RF Upgrade (1.2.9) Subprojects.
 - Availability of Labor Resources

- We will set up Cobra Accounting/ Reporting
- We will continue to refine all subprojects that are not fully scoped.
 - LQPS
 - LLRF
 - Gamma T
 - Booster RF Improvements
 - Booster SS RF Upgrade
 - MI Collimation
- We will submit AIP project documentation
 - Prepare and get approval on AIP PEP's... Project Authorization
 - Submit Davis Bacon Justification's for AIP's